Amendments To The Claims:

This listing of claims will replace all prior listings claims in the application.

Listing Of Claims:

1 - 8. (Withdrawn)

9. (Currently Amended) An optical fibre with a waveguide structure having a longitudinal direction, said optical fibre having:

C1

- a core region extending along the longitudinal direction,

- a cladding region extending along the longitudinal direction, said cladding region comprising an at least substantially two-dimensionally periodic structure comprising primary, elongated elements each having a centre axis extending in the longitudinal direction of the waveguide, the primary elements having a refractive index being lower than a refractive index of any material adjacent to the elongated elements,

the periodic structure being defined, in a cross-section perpendicular to the longitudinal direction, by a unit cell, where the sum of all areas of elongated elements, which areas are comprised within the unit cell, is larger than 1.2 times the area of that primary element having its centre axis not positioned outside the unit cell and having the largest area~~.~~; and

wherein the periodic structure comprises secondary elongated elements having a refractive index being larger than that of any material adjacent thereto and to any material being adjacent to a primary element.

10. (Original) An optical fibre according to claim 9, wherein the sum of all areas of elongated elements comprised within the unit cell is larger than 1.3 times the area of that primary element having its centre axis not positioned outside the unit cell and having the largest area.

11 – 17. (Withdrawn)

18. (Original) An optical fibre with a waveguide structure having a longitudinal direction, said optical fibre having:

- a core region extending along the longitudinal direction,

- a cladding region extending along the longitudinal direction, said cladding region comprising an at least substantially two-dimensionally periodic structure comprising primary, elongated elements each having a centre axis extending in the longitudinal direction of the waveguide, the primary elements having a refractive index being lower than a refractive index of any material adjacent to the primary elements,

the periodic structure being, in a cross-section perpendicular to the longitudinal direction, defined by a unit cell, where, in each unit cell:

$$n_d \Lambda_2 > n_{ud} \Lambda_1(\sqrt{3})$$

where

- n_d is the largest index of refraction within a first circle which is defined as a largest circle possible having a centre not positioned outside the unit cell and not enclosing any part of any primary element,
- n_{ud} is a largest index of refraction not positioned outside the unit cell but outside any of the first circles of the unit cells,
- Λ_1 is a smallest distance between centre axes of two primary elements within the periodic structure,
- Λ_2 is a distance between the centre of the first circle of the unit cell and the centre of the first circle of an adjacent unit cell.

19. (Original) An optical fibre according to claim 18, wherein, for each unit cell: $n_d \Lambda_2 > 2 n_{ud} \Lambda_1$.

20. (Original) An optical fibre according to claim 18, wherein, in each unit cell, n_d is at least substantially identical to n_{ud}.

21. (Original) An optical fibre according to claim 18, wherein, in each unit cell, $n_d > n_{ud}$.

22. (Original) An optical fibre according to claim 18, wherein n_{ud} is and n_d is selected within the interval of 1-10.

23. (Original) An optical fibre according to claim 18, wherein the unit cell comprises further elongated elements each having a centre axis extending in the longitudinal direction of the waveguide, the cross-sectional area of each of the further elements being less than 1/6 of a cross-sectional area of that primary element, having its centre within the unit cell, having the largest cross-sectional area.

24. (Original) An optical fibre according to claim 23, wherein:

$$n_d \Lambda_2 > (\sqrt{3})\, n_{ud} \Lambda_3$$

where

- n_d is the largest index of refraction within a first circle which is defined as a largest circle possible having a centre not positioned outside the unit cell and not enclosing any part of any primary element,
- n_{ud} is a largest index of refraction not positioned outside the unit cell but outside any of the first circles of the unit cells,
- Λ_3 is a smallest distance between centre axes of two primary or further elements within the periodic structure,
- Λ_2 is a smallest distance between the centres of two adjacent first circles.

25. (Original) An optical fibre according to claim 24, wherein, for each unit cell: $n_d \Lambda_2 > 2 n_{ud} \Lambda_3$.

26 – 36. (Withdrawn)

37. (Currently Amended) An optical fibre with a waveguide structure having a longitudinal direction, said optical fibre having:

- a core region extending along the longitudinal direction,

- a cladding region extending along the longitudinal direction, said cladding region comprising an at least substantially two-dimensionally periodic structure comprising primary, elongated elements each having a centre axis extending in the longitudinal direction of the waveguide, the primary elements each having a refractive index being lower than a refractive index of any material adjacent to the primary element,

the periodic structure being, in a cross-section perpendicular to the longitudinal direction, defined by a unit cell, and where a polygon is defined:

- having centres of primary elements in its vertices,
- not enclosing any centres of other primary elements than those having their centres at the vertices of the polygon, and
- having an area less than or equal to that of the unit cell,

the polygon being a regular, hexagonal polygon.; and

wherein the periodic structure further comprises one or more secondary elongated elements having a refractive index higher than that of any material adjacent thereto or adjacent to any primary elements, the secondary elements each has a centre axis extending in the longitudinal direction of the fibre.

38. (Original) An optical fibre according to claim 37, wherein one or more further elongated elements are provided each of which

- has an area not exceeding 1/6 of the area of that primary element having its centre within the unit cell and having the largest area,
- has a refractive index being lower than that of any material adjacent thereto,

where:

- further elements of two polygons sharing a common side are positioned symmetrically around a centre of the common side, and
- further elements of two polygons sharing a single primary element are positioned symmetrically around a centre of the single primary element.

39. (Original) An optical fibre according to claim 38, wherein the one or more further elongated elements each has an area not exceeding 1/8 of the area of that primary element having its centre within the unit cell and having the largest area.

40. (Original) An optical fibre according to claim 37, wherein, in the periodic structure, regular hexagonal polygons exist, all sides of which are shared with another regular hexagonal polygon.

41 – 45. (Withdrawn)

46. (Original) An optical fibre according to claim 18, wherein the periodic structure further comprises one or more secondary elongated elements having a refractive index higher than that of any material adjacent thereto or adjacent to any primary elements, the secondary elements each has a centre axis extending in the longitudinal direction of the fibre.

47. (Original) An optical fibre according to claim 46, wherein, in each unit cell, a secondary element is provided having its centre axis within the first circle.

48 - 51. (Withdrawn)

52. (Cancelled)

53. (Withdrawn)

54. (Original) An optical fibre with a waveguide structure having a longitudinal direction, said optical fibre having:

- a core region extending along the longitudinal direction,

- a cladding region extending along the longitudinal direction, said cladding region comprising an at least substantially two-dimensionally periodic structure comprising primary, elongated elements each having a centre axis extending in the longitudinal direction of the waveguide, the primary elements each having a refractive index being lower than a refractive index of any material adjacent to the primary element,

the periodic structure further comprising secondary, elongated elements each having a refractive index being larger than that of any material adjacent thereto and any material adjacent to a primary element, each secondary element having a centre axis extending in the longitudinal direction of the fibre.

55. (Original) An optical fibre according to claim 54, wherein the periodic structure is, in a cross-section perpendicular to the longitudinal direction, defined by at least one unit cell, where, for each unit cell, a first circle is defined as the largest circular area possible having a centre not positioned outside the unit cell and not enclosing any part of any primary elements, where a secondary element is provided having its centre axis within the first circle.

56. (Original) An optical fibre according to claim 55, wherein a plurality of first primary elements exist, parts of which exist within a distance of 1.2 or less times the radius of the first circle from the centre of the first circle, a polygon being defined as having its vertices at the centres of the plurality of first primary elements, the polygon being a regular, hexagonal polygon.

57. (Original) An optical fibre according to claim 56, wherein, in the periodic structure, hexagonal polygons exist, all sides of which are common to another hexagonal polygon.

58. (Original) An optical fibre according to claim 56, wherein the structure is defined by the hexagonal polygon and a regular triangle having a side length corresponding to that of the regular hexagonal polygon, and where hexagonal polygons exist, each side of which is common to a triangle.

59 – 66. (Withdrawn)

67. (Original) An optical fibre according to claim 18, wherein the core region comprises a first additional elongated element extending in the longitudinal direction of the fibre.

68. (Original) An optical fibre according to claim 67, wherein the first additional element is a void.

69. (Original) An optical fibre according to claim 67, wherein the additional element or any material adjacent thereto comprises a dopant or a material showing higher order optical effects.

70. (Original) An optical fibre according to claim 67, wherein the core region comprises a second aditional elongated element, the first and second additional elements being positioned at

a distance where light travelling in one additional element is able to couple to the other additional element.

71 – 78. (Withdrawn)

79. (Currently Amended) An optical fibre with a waveguide structure having a longitudinal direction, said optical fibre having:

- a core region extending along the longitudinal direction,

- a cladding region extending along the longitudinal direction, said cladding region comprising an at least substantially two-dimensionally periodic structure comprising primary, elongated elements each having a centre axis extending in the longitudinal direction of the waveguide, the primary elements each having a refractive index being lower than a refractive index of any material adjacent to the primary element,

the periodic structure being, in a cross-section perpendicular to the longitudinal direction, defined by a unit cell, and where a polygon is defined:

- having centres of primary elements in its vertices,
- not enclosing any centres of other primary elements than those having their centres at the vertices of the polygon, and
- having an area less than or equal to that of the unit cell,

the polygon being a regular, hexagonal polygon; ~~An optical fibre according to claim 37,~~

wherein the core region comprises a first additional elongated element extending in the longitudinal direction of the fibre.

80. (Original) An optical fibre according to claim 79, wherein the first additional element is a void.

81. (Original) An optical fibre according to claim 79, wherein the additional element or any material adjacent thereto comprises a dopant or a material showing higher order optical effects.

82. (Original) An optical fibre according to claim 79, wherein the core region comprises a second additional elongated element, the first and second additional elements being positioned at a distance where light travelling in one additional element is able to couple to the other additional element.

83. (Previously Amended) An optical fibre according to claim 54, wherein the core region comprises a first additional elongated element extending in the longitudinal direction of the fibre.

84. (Original) An optical fibre according to claim 83, wherein the first additional element is a void.

85. (Original) An optical fibre according to claim 83, wherein the additional element or any material adjacent thereto comprises a dopant or a material showing higher order optical effects.

86. (Original) An optical fibre according to claim 83, wherein the core region comprises a second additional elongated element, the first and second additional elements being positioned at a distance where light travelling in one additional element is able to couple to the other additional element.

87 – 90. (Withdrawn)

91. (Original) An optical fibre according to claim 18, the fibre comprising a plurality of core regions.

92. (Original) An optical fibre according to claim 91, wherein the core regions are positioned symmetrically within the periodical structure, a period of the core regions being larger than a period of the periodical structure.

93. – 96. (Cancelled)

97. (Currently Amended) An optical fibre according to claim ~~3779~~, the fibre comprising a plurality of core regions.

98. (Original) An optical fibre according to claim 97, wherein the core regions are positioned symmetrically within the periodical structure, a period of the core regions being larger than a period of the periodical structure.

99. (Previously Amended) An optical fibre according to claim 54, the fibre comprising a plurality of core regions.

100. (Original) An optical fibre according to claim 99, wherein the core regions are positioned symmetrically within the periodical structure, a period of the core regions being larger than a period of the periodical structure.

C1

101 –106. (Withdrawn)

107. (Original) A sensor for sensing or detecting at least one characteristic of a liquid or gas, the sensor comprising:

- a length of the optical fibre according to claim 18, wherein the core region comprises at least a first additional element, the first element being a void extending along the longitudinal direction of the fibre,
- means for providing the liquid or gas into the void of the core region,
- means for introducing light into the core region, the light being adapted to interact with the gas or liquid in a manner so that the characteristic of the liquid or gas may be determined,

- means for detecting light emitted from the fibre and for determining the characteristic of the liquid or gas.

108. (Original) A sensor according to claim 107, wherein the introducing means are adapted to introduce the light into the first additional element.

109.(Original) A sensor according to claim 107, wherein the core region comprises a second, elongated element extending in the longitudinal direction of the fibre, where the first and second additional elements are positioned at a distance where light travelling in one additional element is able to couple to the other additional element, and wherein the introducing means are adapted to introduce the light into the second additional element.

C)

110 – 115. (Withdrawn)

116. (Original) A sensor for sensing or detecting at least one characteristic of a liquid or gas, the sensor comprising:

- a length of the optical fibre according to claim 37, wherein the core region comprises at least a first additional element, the first element being a void extending along the longitudinal direction of the fibre,
- means for providing the liquid or gas into the void of the core region,
- means for introducing light into the core region, the light being adapted to interact with the gas or liquid in a manner so that the characteristic of the liquid or gas may be determined,

- means for detecting light emitted from the fibre and for determining the characteristic of the liquid or gas.

117. (Original) A sensor according to claim 116, wherein the introducing means are adapted to introduce the light into the first additional element.

118. (Original) A sensor according to claim 116, wherein the core region comprises a second, elongated element extending in the longitudinal direction of the fibre, where the first and second additional elements are positioned at a distance where light travelling in one additional element is able to couple to the other additional element, and wherein the introducing means are adapted to introduce the light into the second additional element.

119. (Previously Amended) A sensor for sensing or detecting at least one characteristic of a liquid or gas, the sensor comprising:

- a length of the optical fibre according to claim 54, wherein the core region comprises at least a first additional element, the first element being a void extending along the longitudinal direction of the fibre,
- means for providing the liquid or gas into the void of the core region,
- means for introducing light into the core region, the light being adapted to interact with the gas or liquid in a manner so that the characteristic of the liquid or gas may be determined,
- means for detecting light emitted from the fibre and for determining the characteristic of the liquid or gas.

120. (Original) A sensor according to claim 119, wherein the introducing means are adapted to introduce the light into the first additional element.

121. (Original) A sensor according to claim 119, wherein the core region comprises a second, elongated element extending in the longitudinal direction of the fibre, where the first and second additional elements are positioned at a distance where light travelling in one additional element is able to couple to the other additional element, and wherein the introducing means are adapted to introduce the light into the second additional element.

122 – 123. (Withdrawn)

124. (Original) A fibre amplifier for amplifying an optical signal, said fibre amplifier comprising:

- a length of optical fibre according to claim 18, wherein the core region comprises a dopant material along at least part of the length, and

- means for providing pump radiation to the dopant material for pumping the dopant material so as to amplify the optical signal.

125 – 126. (Withdrawn)

127. (Original) A fibre amplifier for amplifying an optical signal, said fibre amplifier comprising:

- a length of optical fibre according to claim 37, wherein the core region comprises a dopant material along at least part of the length, and

- means for providing pump radiation to the dopant material for pumping the dopant material so as to amplify the optical signal.

128. (Currently Amended) A fibre amplifier for amplifying an optical signal, said fibre amplifier comprising:

- a length of optical fibre according to claim 4454, wherein the core region comprises a dopant material along at least part of the length, and

- means for providing pump radiation to the dopant material for pumping the dopant material so as to amplify the optical signal.

129 –130. (Withdrawn)

131. (Original) A fibre laser for outputting laser radiation, said fibre laser comprising:

- a length of optical fibre according to claim 18, wherein the core region comprises a dopant material along at least part of the length,

- means for providing pump radiation to the dopant material for pumping the dopant material so as to amplify the optical signal, and

- feedback means for selectively feeding back at least part of the amplified optical signal so as to repeatedly pass the amplified optical signal through the length of the optical fibre so as to further amplify the optical signal.

132 – 133. (Withdrawn)

C1

134. (Original) A fibre laser for outputting laser radiation, said fibre laser comprising:

- a length of optical fibre according to claim 37, wherein the core region comprises a dopant material along at least part of the length,

- means for providing pump radiation to the dopant material for pumping the dopant material so as to amplify the optical signal, and

- feedback means for selectively feeding back at least part of the amplified optical signal so as to repeatedly pass the amplified optical signal through the length of the optical fibre so as to further amplify the optical signal.

135. (Currently Amended) A fibre laser for outputting laser radiation, said fibre laser comprising:

- a length of optical fibre according to claim 4454, wherein the core region comprises a dopant material along at least part of the length,

- means for providing pump radiation to the dopant material for pumping the dopant material so as to amplify the optical signal, and

- feedback means for selectively feeding back at least part of the amplified optical signal so as to repeatedly pass the amplified optical signal through the length of the optical fibre so as to further amplify the optical signal.